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ABSTRACT

The nutrition knowledge, attitudes, and practices of secondary teachers of health and physical education, home economics, science, and social studies were assessed. Of the 518 teachers who completed the survey instruments, 43 percent had never taken a food or nutrition course, and 63 percent had no inservice training in nutrition or food instruction. Home economics teachers scored significantly higher than did other teachers on a test measuring nutrition knowledge level. In a measurement of attitudes toward teaching nutrition, home economics teachers were assessed as having the most positive attitudes, while social studies teachers had the least positive. The assessment of teachers' attitudes toward their own nutrition found no clear differences among the teachers, all of whom had positive attitudes toward their own nutrition. Nearly two-thirds of the teachers reported teaching some aspect of food and nutrition in their classes. Generally, teachers who taught about food and nutrition had taken more food and nutrition courses and had higher knowledge scores and more favorable attitudes toward teaching nutrition. The data support the idea that teachers should have preservice training in food and nutrition. (Authors/FG)

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SECONDARY TEACHERS' NUTRITION KNOWLEDGE ATTITUDES AND PRACTICES

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SECONDARY TEACHERS' NUTRITION KNOWLEDGE,
ATTITUDES AND PRACTICES

The nutrition knowledge, attitudes and practices of secondary health/physical education, home economics, science and social science teachers were assessed using the 40-item Nutrition Knowledge Test (NKT) and a questionnaire containing Likert attitude statements, semantic differential scales, demographic questions and other questions. Instruments were mailed to 1191 randomly chosen teachers. Forty-four percent of teachers completed the survey. Forty-three percent of them had never taken a food/nutrition course, 63% had no inservice food/nutrition training. Home economics teachers had a significantly higher mean NKT score, 28, than other teachers. K-R 20 reliability coefficients ranged from .69 to .82. One Likert scale and one semantic differential scale were used to assess attitudes toward teaching nutrition. Home economics teachers had the highest mean score and social science teachers had the lowest. The second semantic differential scale assessed attitude toward teachers' own nutrition. No clear differences were detected among the four teacher groups. All groups had positive attitudes toward their own nutrition. Nearly two-thirds of teachers reported teaching something about food/nutrition. Generally, teachers, who taught something about food/nutrition had taken more food/nutrition courses, had higher knowledge scores and more favorable attitudes toward teaching nutrition.

SECONDARY TEACHERS' NUTRITION KNOWLEDGE ATTITUDES AND PRACTICES

Introduction

Teachers can have an important role in nutrition education. Recent legislation and available curriculum materials support the integration of nutrition into a variety of subjects, at all grade levels. Traditionally taught within home economic courses, nutrition was also mandated as a curriculum component of health education in ten states (1). However, the inclusion of nutrition in courses is generally determined by the individual teacher.

Teachers must have at least a minimal level of substantive knowledge to teach nutrition. A few researchers have studied elementary teachers' nutrition knowledge (2,3). Little information was found in the published literature regarding secondary teachers. Nutrition educators have often viewed attitudes as having a role in changing or improving eating behavior. A stated goal for nutrition education of the National Nutrition Consortium is "to create positive attitudes toward good nutrition" (4). The policy statement further indicates that educational efforts should include evaluation components to assess attitudes, cognitive and/or behavioral change. Because teachers can play an important part in nutrition education, their attitudes toward nutrition are important, particularly since they are not generally required to incorporate food/nutrition topics into their courses. Because little information was known regarding the nutrition knowledge, attitudes and practices of secondary teachers, and because PL 95-166 and available nutrition education materials supported an integrated approach to teaching nutrition, the objective of this study was to

compare the nutrition knowledge, attitudes and practices of secondary teachers of health/physical education, home economics, science and social science.

Methods

Prior to collecting any data, approval for the study was obtained from the University Committee on Research Involving Human Subjects.

Data from preliminary interviews of 32 secondary teachers and from the literature were used to refine two semantic differential attitude scales, to write Likert attitude statements and to develop background and practice questions for a mail questionnaire.

A survey questionnaire was developed and printed on 2 marked-sense computer cards. The questionnaire contained 48 Likert-type attitude statements and two concepts, "My Own Nutrition" and "My Teaching Food and Nutrition" for semantic differential evaluation, following the methods of Osgood, Tannenbaum and Suci (5). The remaining questions were demographic or related to teachers' background and responsibility, nutrition education, teachers' personal practices and interests.

The survey and the 40-item Nutrition Knowledge Test (NKT) developed previously (6) were mailed to four samples of secondary teachers drawn randomly from the 1979-80 teacher certification list from the Department of Education of a large, midwestern state. Teachers selected were secondary teachers of health/physical education, home economics, science and social science. Approximately 300 names were drawn for each subject group. A total of 1191 teachers were sent instruments.

The NKT was scored and item analyzed. Item analysis data included the Kuder-Richardson (K-R) 20 reliability coefficient, the index of discrimination and the index of difficulty.

The Teacher Survey data were analyzed using SPSS programs (7). Frequencies and associated statistics were obtained for all variables for the total set of

data. Factor analysis and reliability determinations were used to select a 14-statement Likert scale for assessing teachers attitudes toward teaching nutrition. Reliability coefficients were determined for the Likert scale and for the two semantic differential scales. T-tests were used to determine differences between means dividing the groups on selected dichotomous variables. One-way analysis of variance followed by Scheffé's test was used to determine differences among score means for the four teacher groups.

Results

Sample Characteristics. Five hundred and eighteen (44%) teachers completed the survey. They were teachers of health/physical education, 20%; home economics, 31%; science, 27%; and social science, 21%. Forty-six percent of the respondents were male; 50% were female. The sex of teachers varied significantly across the groups (chi-square = 232, $p < .001$).

Food/Nutrition Training. Forty-three percent of the teachers reported never having taken a food/nutrition course. The remainder had 1-9 or more courses. The mean number of food/nutrition courses taken was 1.8 for all teachers. Home economics teachers had a significantly higher ($p < .05$) mean number of food/nutrition courses, 4.3, than health/physical education teachers, and both had taken more courses than science or social science teachers (Table 1). Those two groups had taken similar numbers of courses. Only 5% of home economics teachers reported never taking a food/nutrition course, whereas 68% of science teachers and 72% of social science teachers reported taking no food/nutrition courses.

Some teachers had additional food/nutrition training. However, nearly 65% of all teachers reported taking no hours of food/nutrition content training since they had started teaching. The remainder had 1-99 hours. A mean of 4.6 hours was obtained for all teachers. Home economics teachers had significantly more hours of content training than any of the other teacher subject groups ($p < .05$).

Teachers' Nutrition Knowledge. Five hundred sixteen teachers completed the 40-item Nutrition Knowledge Test (NKT). Home economics teachers had the highest mean score, 28 (70%) which was significantly higher than the other teacher groups using Scheffé's test at the .05 probability level (Table 2). Social science teachers had the lowest, 19 (47%). Means for science teachers and health/physical education teachers were 23 (57%) and 21 (52%), respectively. The overall mean for the entire group was 23 (57%).

The KR-20 reliability coefficients for the subject groups ranged from .69 for social science teachers to .82 for home economics teachers. The KR-20 tends to be higher when subjects are heterogeneous and items are homogeneous. The KR-20 may be higher for home economics teachers because the sample included those teaching clothing, family living and other non-food/nutrition subjects, possibly making this group more heterogeneous than social science teachers who knew quite a bit about nutrition, and others who knew less, as evidenced by a somewhat larger standard deviation for home economics than for social science teachers.

Teachers' Nutrition Attitudes. Two attitude scales, one Likert and one semantic differential, were used to assess attitudes toward teaching nutrition. The third scale was a semantic differential scale to assess teachers' attitudes toward their own nutrition.

Total scores for each person on each scale were determined (Table 3). Since the Likert statements were scored from 1-5, a total of 70 was possible for the Likert teaching nutrition scale. The semantic differential scales were scored from 1-7. Therefore, the highest scores could be 49 and 35 for the scales; "My Teaching Food and Nutrition" and "My Own Nutrition," respectively. For all scales, the higher the score, the more positive or favorable the attitude

being measured. Home economics teachers had the highest mean score and social science teachers had the lowest on the first two scales. Social science teachers' score of 23 reflects a negative attitude toward teaching food/nutrition.

On the Likert teaching nutrition scale, significant score variation ($p < .001$) was found using one-way analysis of variance. Scheffé's test detected differences among all teacher groups except health/physical education and science which had similar means (Table 3). Health/physical education teachers and science teachers also had similar scores on the semantic differential scale "My Teaching Food and Nutrition" and score variation was significant ($p < .001$).

Scores on the second semantic differential scale, "My Own Nutrition," varied significantly ($p < .01$). Scheffé's test resulted in two subsets of teacher groups having similar means, however, no distinct differences among the four teacher groups were found since two teacher groups were in each subset.

All the teacher groups had positive attitudes toward their own nutrition. The mean percentage score for all teachers on the semantic differential scale, "My Own Nutrition," was 77%. For the Likert teaching scale the mean percentage score was 73% and for the semantic differential teaching scale the mean percentage score was 64%. Thus, teachers were more positive regarding their own nutrition than they were regarding the teaching of nutrition. Similar results have been reported in the literature where teachers have had positive attitudes toward nutrition in general, but not toward teaching nutrition.

Nutrition Teaching Practices. We asked teachers if they taught anything about food/nutrition in their classes and to check topics they taught. Sixty-five percent of all teachers reported teaching something about food/nutrition in their classes. For each teacher group, the percentages indicating they taught something about food/nutrition were: health/physical education, 64%; home economics, 95%; science, 62%; and social science, 29%. T-tests were performed on several variables comparing teachers who taught with those who

did not teach something about food/nutrition in their classes (Table 4). Teachers, except home economics teachers, who taught something about food/nutrition in their classes had taken more food/nutrition courses than those who did not. Those who taught food/nutrition also had higher NKT scores and more favorable attitudes toward teaching nutrition, on both the Likert and the semantic differential scales assessing attitudes toward teaching nutrition.

Teachers checked food/nutrition topics they taught in their classes. Table 5 indicates the most frequently taught topic for all teachers was nutrition and general health, (57%). The topic taught lease was maternal/child nutrition (25%). For each topic, significant differences in proportions of teachers teaching it, by subject group, were found ($p < .001$). Health/physical education teachers most frequently taught nutrition topics related to physical fitness, athletic training and weight control. Home economics teachers taught topics related to food groups, food preparation, nutrients and consumer information with greater frequency.

Nutrition-related personal behaviors of teachers were assessed: school lunch participation and dieting to lose weight. Forty-nine percent of all teachers never ate the school lunch. Thus, many teachers may not even be familiar with the school lunch programs in their buildings. Home Economics teachers had the lowest rate of participation in the lunch program. Lack of home economics teachers participation may be due, in part, to dieting behavior since female ($p < .001$) and home economics teachers ($p < .01$) were more likely to be on weight-loss diets than males or teachers in the other subject groups.

The results of this study inidcate that the secondary teachers, including home economics teachers, generally had a low level of nutrition knowledge. The data further indicate that those teachers who actually taught some food/nutrition in their classes had taken more food/nutrition courses. Thus, the data support the idea that teachers should have pre-service training in food/nutrition. In

addition, non-home economics teachers who taught food/nutrition in their classes had significantly more hours of food/nutrition training after starting to teach, supporting the notion of inservice training for them.

The Likert teaching nutrition scale and the semantic differential scale, "My Teaching Food and Nutrition," may be useful evaluation tools for other nutrition education studies of secondary teachers. The scales detected differences in attitudes among the teacher subject groups and were shown to be reliable measures of attitudes toward teaching nutrition. Scores on the scale "My Own Nutrition" revealed teachers had positive attitudes toward their own nutrition. However, no differences were detected in scores among the four groups in this study. In addition, teachers' scores were all high on that scale. Therfore, it would not be a useful measure for pre-post test attitude assessments because the scale would leave little scoring range to show increased favorability of attitudes based on some treatment or intervention. This research indicates that teachers are positive about nutrition, in general, regardless of training or of whether or not they teach food/nutrition.

The majority of health/physical education, home economics and science teachers reported they had taught something about food/nutrition in their classes. Since home economics teachers reach only a certain group of students, nutrition education efforts might be better focused toward health/physical education and toward science teachers who would reach a larger proportion of secondary students. However, the lower knowledge scores of teachers in those two groups suggest the need for training or other support for those teachers.

Conclusion

In conclusion, teachers' nutrition knowledge, attitudes and practices were assessed. Teachers had low knowledge scores, and with the exception of social science teachers, positive attitudes toward teaching nutrition. Teachers' attitudes toward their own nutrition were favorable and similar across subject

groups. The majority of health/physical education, home economics and science teachers taught something about food/nutrition in their classes.

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Table 1 Nutrition courses and post-college hours of training

Subject Taught (n)	Food/Nutrition Training	
	Courses[a]	Post-college Hours[b]
	Mean	
Health/Physical Education (103)	1.4	3.7
Home Economics (159)	4.3	10.7
Science (142)	.6	1.8
Social Science (108)	.4	.5

[a]One-way analysis of variance followed by Scheffé's test resulted in three subsets with significantly different means ($p < .05$): 1) home economics 2) health/physical education 3) science-social science.

[b]One-way analysis of variance followed by Scheffé's test resulted in two subsets with significantly different means ($p < .05$): 1) home economics 2) all other teachers.

Table 2 NKT scores and test reliability coefficients (40-item test)

Subject Taught (n)	Mean[a]	Standard Deviation	K-R 20
Health/Physical Education (103)	21	5.9	.77
Home Economics (162)	28	5.9	.82
Science (141)	23	5.1	.72
Social Science (110)	19	5.2	.69

[a]One-way analysis of variance followed by Scheffé's test resulted in three subsets with significantly different means ($p < .05$): 1) home economics 2) health/physical education-science 3) social science-health/physical education.

Table 3 Attitude score and scale reliability coefficients

Subject Taught	Likert Scale: Teaching Nutrition (14 items)			Semantic Differential: My Teaching Food/Nutrition (7 items)			Semantic Differential: My Own Nutrition (5 items)		
	Mean[a]	Standard Deviation	Alpha	Mean[b]	Standard Deviation	Alpha	Mean[c]	Standard Deviation	Alpha
Health/Physical Education	52.9	6.4	.82	30.1	16.2	.96	24.9	10.5	.72
Home Economics	56.5	9.7	.84	38.6	14.2	.88	29.0	8.4	.76
Science	49.6	8.2	.91	31.6	13.2	.92	26.8	9.5	.76
Social Science	44.1	10.3	.92	23.6	15.0	.92	26.2	10.3	.81

[a]One-way analysis of variance followed by Scheffé's test resulted in four subsets with significantly different means (p .05): 1) home economics 2) health/physical education 3) science 4) social science

[b]One-way analysis of variance followed by Scheffé's test resulted in three subsets with significantly different means (p .05): 1) home economics 2) health/physical education-science 3) social science

[c]One-way analysis of variance followed by Scheffé's test resulted in two subsets with significantly different means (p .05): 1) health/physical education-science-social science 2) home economics-science-social science

Table 4 Food/Nutrition background and scores of teachers who taught compared with those who did not teach about food/nutrition

Variable	Health/Physical Education	Home Economics	Science	Social Science
	T-test		Probability	
Food/nutrition courses taken	.037*	.089	.000***	.031*
Hours food/nutrition training	.065	.000***	.248	.463
NKT score	.044*	.001***	.001***	.015*
Likert score-Teaching nutrition	.000***	.001***	.000***	.042*
Semantic differential score - My teaching food/nutrition	.020*	.163	.000***	.002**
Semantic differential score - My own nutrition	.051	.346	.437	.238

* p .05, ** p .01, *** p .001

Table 5 Distribution of food/nutrition topics taught by teachers

Topic	Subject taught: Health/Physical Education N	Health/Physical Education Percentage[a]	Home Economics N	Home Economics Percentage[a]	Science N	Science Percentage[a]	Social Science N	Social Science Percentage[a]	Chi-square
Food groups/Balanced diet	50	47	146	91	48	34	8	7	203.6***
Calories/Weight Control	55	51	121	75	66	47	16	15	97.1***
Consumer information	37	35	136	84	44	31	44	31	111.9***
Digestion/Composition of food	45	42	91	57	79	56	6	6	86.3***
Fitness/Athletic training	80	75	66	41	42	30	31	28	62.6***
Food choices	48	45	138	86	49	35	25	23	130.1***
Food habits	29	27	103	64	34	24	40	36	65.1***
Food preparation	13	12	134	83	12	8	10	9	277.1***
Maternal/Child nutrition	15	14	82	51	20	14	14	13	78.0***
Nutrient functions/ Needs/Sources	37	35	144	89	62	44	13	12	183.5***
Nutrition and general health	61	57	138	86	72	51	24	22	112.5***
Nutrition and related disease	44	41	121	75	65	46	18	16	92.7***

[a]Percentages based on N in each subject group
*** p .001